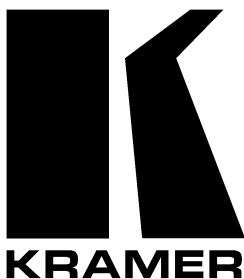


Kramer Electronics, Ltd.



USER MANUAL

VM-20HD

Dual 1:10 HD/SD – SDI Distribution Amplifier

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1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in 8 Groups¹, which are clearly defined by function.

Congratulations on purchasing your Kramer **VM-20HD Dual 1:10 HD²/SD³ - SDI Distribution Amplifier**, which is ideal for:

- SDI production studios for signal distribution
- Broadcast studios for on-air operation
- SDI field production
- Using with SDI video sources such as professional digital cameras

The package includes the following items:

- **VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier**
- Power cord
- This user manual⁴

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables⁵

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 High Definition (HD) means a video format, consisting of either 720 active lines of progressive video or 1080 lines of either progressive or interlaced video

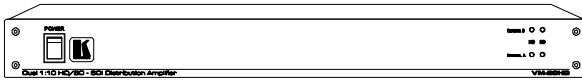
3 Standard Definition (SD) means an NTSC or PAL compatible video format, consisting of 480 (for NTSC) or 576 (for PAL) lines of interlaced video

4 Download up-to-date Kramer user manuals from the Internet at this URL: <http://www.kramerelectronics.com>

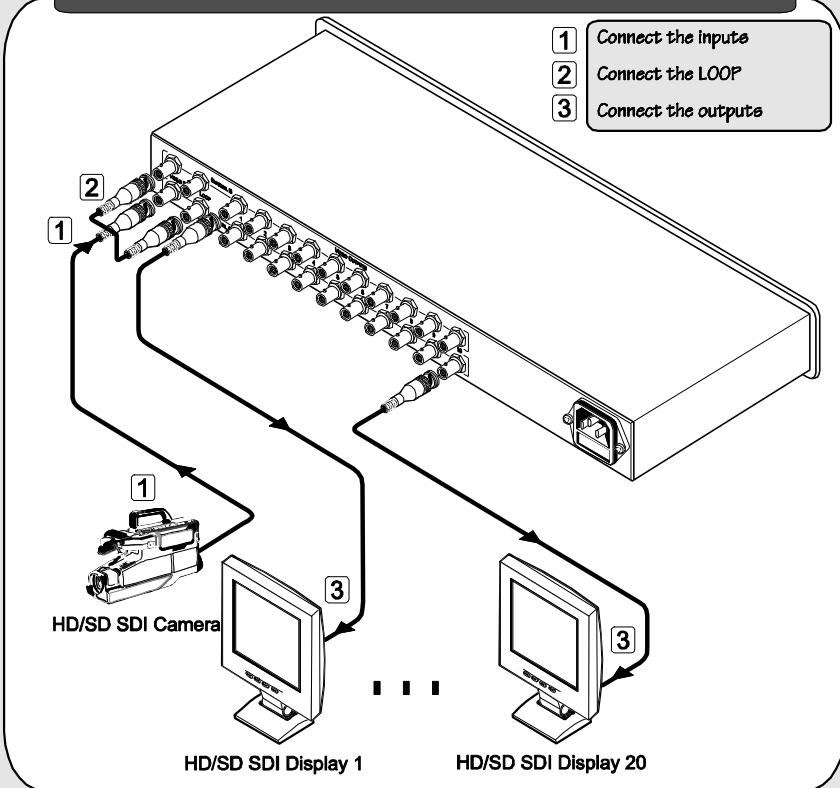
5 The complete list of Kramer cables is on our Web site at <http://www.kramerelectronics.com>

Step 1: Mount the machine - see section 5

Mount the machine in a rack or stick the 4 rubber feet to the underside



Step 2: Connect the input and the outputs - see section 6



Step 3: Turn the power ON

3 Overview

The **VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier** is a high performance dual channel distribution amplifier for SDI (SMPTE 259M and SMPTE 344M) and HD-SDI (SMPTE 292M) signals. It will take one input per channel, provide reclocking and equalization and distribute each signal to 10 outputs, using BNC connectors.

In particular, the **VM-20HD**:

- Can be configured as a 1:20 DA
- Has an active loop BNC connector on each channel, for cascading additional units
- Has a video bandwidth of 1.485Gbps that allows it to be used for standard definition and high definition serial digital video signals (SD/HD-SDI)
- Is SMPTE 259M, 292M and 344M compliant
- Supports data rates of 270, 1483.5, and 1485Mbps
- Provides automatic, multi-rate, equalization and reclocking for losses typical with long runs of 75Ω co-axial cable
- Has HD and SD output indication LEDs for each channel

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise- levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your Kramer **VM-20HD** away from moisture, excessive sunlight and dust

4 Your VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier

Figure 1 and Table 1 define the **VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier**:

Your VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier

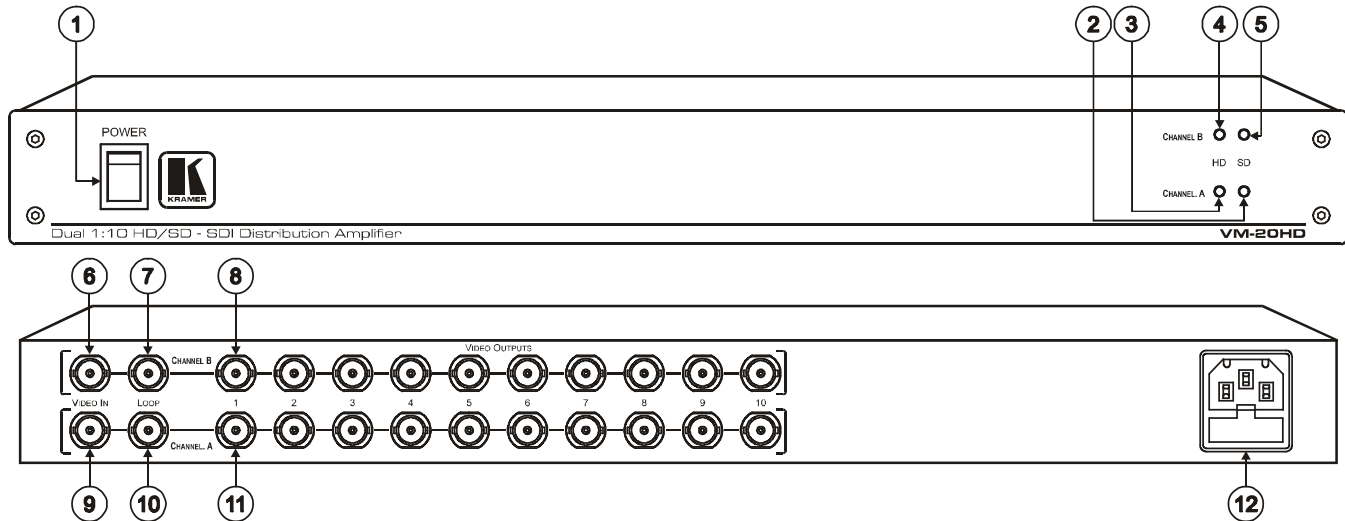


Figure 1: VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier

Table 1: VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier Features

#	Feature		Function
1	POWER Switch		Illuminated switch for turning the unit ON or OFF
2	CHANNEL A	SD ¹ LED	The green LED lights when the SDI signal in channel A is SD
3		HD ² LED	The blue LED lights when the SDI signal in channel A is HD
4	CHANNEL B	HD ² LED	The blue LED lights when the SDI signal in channel B is HD
5		SD ¹ LED	The green LED lights when the SDI signal in channel B is SD
6	CHANNEL B BNC Connectors	VIDEO IN	Connects to the channel B SDI source
7		LOOP	Connects the channel B input to the video input of an additional unit or to the channel A video input ³
8		VIDEO OUTPUTS	Connects to the channel B SDI acceptors (from 1 to 10)
9	CHANNEL A BNC Connectors	VIDEO IN	Connects to the channel A SDI source
10		LOOP	Connects the channel A input to the video input of an additional unit or to the channel B video input ³
11		VIDEO OUTPUTS	Connects to the channel A SDI acceptors (from 1 to 10)
12	Power Connector with Fuse		AC connector enabling power supply to the unit

1 Standard Definition (SD) means an NTSC or PAL compatible video format, consisting of 480 (for NTSC) or 576 (for PAL) lines of interlaced video

2 High Definition (HD) means a video format, consisting of either 720 active lines of progressive video or 1080 lines of either progressive or interlaced video

3 To create a 1:20 distribution amplifier (connect the LOOP output of one of the channels to the VIDEO IN of the other channel)

5 Installing the VM-20HD on a Rack

This section describes what to do before installing on a rack and how to rack mount.

Before Installing on a Rack

Before installing on a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5 to +45 Deg. Centigrade
Operating humidity range	5 to 65% RHL, non-condensing
Storage temperature range	-20 to +70 Deg. Centigrade
Storage humidity range	5 to 95% RHL, non-condensing



CAUTION!!

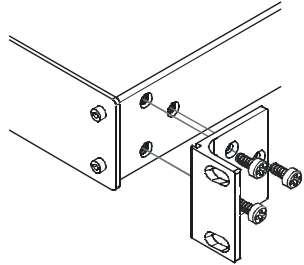
When installing on a 19" rack, avoid hazards by taking care that:

- 1 It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
- 2 Once rack mounted, enough air will still flow around the machine.
- 3 The machine is placed straight in the correct horizontal position.
- 4 You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
- 5 The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to supply connections other than direct connections to the branch circuit (for example, the use of power strips), and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

- 1 Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



- 2 Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note that:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions (you can download it at: <http://www.kramerelectronics.com>)

6 Connecting the VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier

To connect the **VM-20HD**, as the example in Figure 2 illustrates, do the following¹:

1. Connect an HD-SDI/SD-SDI video source (for example, an HD/SD SDI camera) to the CHANNEL A VIDEO IN BNC connector.
2. Connect the CHANNEL A LOOP BNC connector to the CHANNEL B VIDEO IN BNC connector.
3. Connect up to² 20 VIDEO OUTPUT BNC connectors to the appropriate HD/SD SDI video acceptors (for example, HD/SD SDI displays).
4. Connect the power cord (not illustrated in Figure 2).

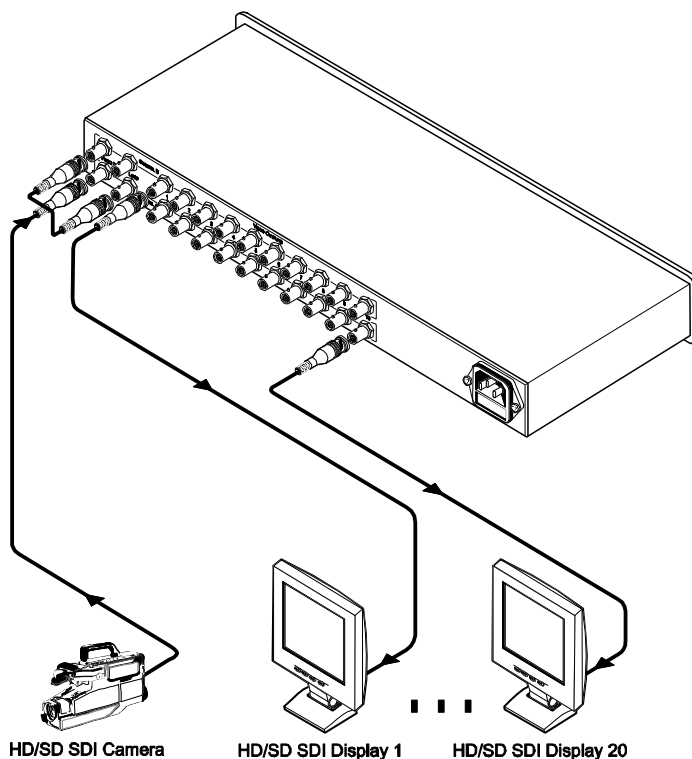


Figure 2: Connecting the VM-20HD Dual 1:10 HD/SD - SDI Distribution Amplifier

¹ Switch OFF the power on each device before connecting it to your VM-20HD. After connecting your VM-20HD, switch on its power and then switch on the power on each device

² You do not have to connect all the outputs, connect only those that are required and leave the other output(s) unconnected

7 Technical Specifications

Table 2 includes the technical specifications:

Table 2: Technical Specifications¹ of the VM-20HD

INPUTS:	2 SMPTE-259M, 292M, 344M serial video, 75 ohms on a BNC connector
OUTPUTS:	22 equalized and reclocked SMPTE-259M, 292M, 344M outputs, 75 ohms on BNC connectors
RESOLUTION:	8 and 10-bits (automatic)
MAX. OUTPUT LEVEL:	800mVpp /75 ohms
MAX. BAUD RATE:	1.485Gbps
COUPLING:	AC
POWER SOURCE:	100–240VAC; 50/60Hz, 9VA
DIMENSIONS:	19-inch (W), 7-inch (D), 1U (H)
WEIGHT:	1.5kg. (3.3lbs.) approx.
ACCESSORIES:	Power cord

¹ Specifications are subject to change without notice

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
 - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
 - ii) Product modification, or failure to follow instructions supplied with the product
 - iii) Repair or attempted repair by anyone not authorized by Kramer
 - iv) Any shipment of the product (claims must be presented to the carrier)
 - v) Removal or installation of the product
 - vi) Any other cause, which does not relate to a product defect
 - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on your product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

- EN-50081: "Electromagnetic compatibility (EMC);
generic emission standard.
Part 1: Residential, commercial and light industry"
- EN-50082: "Electromagnetic compatibility (EMC) generic immunity standard.
Part 1: Residential, commercial and light industry environment".
- CFR-47: FCC Rules and Regulations:
Part 15: "Radio frequency devices
Subpart B Unintentional radiators"

CAUTION!

- ☒ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ☒ Use the supplied DC power supply to feed power to the machine.
- ☒ Please use recommended interconnection cables to connect the machine to other components.



For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, where updates to this user manual may be found. We welcome your questions, comments and feedback.



Caution

Safety Warning:

Disconnect the unit from the power supply before opening/servicing.



Kramer Electronics, Ltd.

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